

AD-A176 258

COMPARATIVE INHALATION TOXICOLOGY OF SELECTED MATERIALS 3/3

(U) LOVELACE BIOMEDICAL AND ENVIRONMENTAL RESEARCH INST

ALBUQUERQUE NM INHALATION TOXICOLOGY RESEARCH INST

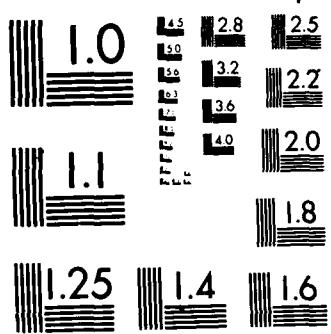
UNCLASSIFIED

M B SNIPES ET AL SEP 86

F/G 6/20

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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

EXPERIMENT 41601: NOSE-ONLY EXPOSURE TO Cu-Zn METAL POWDER.

ANIMAL NUMBER	DAY OF STUDY	LUNG	LIVER	KIDNEY	SPLEEN	ADRENAL	THYROID	TURBONITES
025	2	Multifocal necrotic terminal bronchiolitis with extension into alveoli.	NSL	Hyaline casts	NSL	NSL	NSL	Multifocal acute necrotic ulcerative and erosive rhini- tis with epi- thelial regen- eration.
026	2	Multifocal terminal bronchiolitis.	NSL	Occasional hyaline casts.	NSL	NSL	NSL	Moderately severe acute necrotic ulcerative & erosive rhinitis.
033	5	Bronchiolitis with extension into alveoli.	NSL	Occasional hyaline casts; NSL	NSL	NSL	NSL	Acute mild rhinitis.
037	2	Mild patchy acute bronchiolitis with extension into alveoli.	NSL	NSL	NSL	NSL	NSL	Acute multi- focal rela- tively severe erosive to ulcerative rhinitis.
038	2	Multifocal necrotic terminal bronchiolitis with extension into alveoli.	NSL	Occasional hyaline casts.	NSL	NSL	NSL	Acute multi- focal rela- tively severe erosive to ulcerative rhinitis.

040	5	Perivascular and peribronchiolar fibrosis; multifocal necrotic bronchiolitis with extension into alveoli; fibrin.	NSL	Hyaline casts; NSL	NSL	Lymphoid depletion.	Acute multi-focal relatively severe erosive to ulcerative rhinitis.
046	2	Perivascular fibrosis multifocal necrotic bronchiolitis.	NSL	NSL	NSL	NSL	Acute multi-focal relatively severe erosive to ulcerative rhinitis.
048	5	Multifocal necrotic bronchiolitis with extension into alveoli; hemorrhage; fibrin.	NSL	NSL	NSL	Lymphoid depletion.	Acute multi-focal relatively severe erosive to ulcerative rhinitis.
050	5	Multifocal necrotic bronchiolitis with extension into alveoli; hemorrhage; fibrin.	NSL	Moderate hyaline casts.	NSL	Lymphoid depletion.	Acute multi-focal moderately severe erosive to ulcerative rhinitis.
052	5	Multifocal necrotic bronchiolitis with extension into alveoli; hemorrhage; fibrin.	NSL	NSL	NSL	Lymphoid depletion.	Acute multi-focal moderately severe erosive to ulcerative rhinitis.

## C. EXPERIMENT 4181: WHOLE-BODY EXPOSURE TO 1102

ANIMAL NUMBER	DAY OF STUDY	LUNG	LIVER	KIDNEY	SPLEEN	ADRENAL	THYROID	TURBINES
055	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
056	5	NSL	NSL	Occasional hyaline casts; NSL.	NSL	NSL	NSL	Congested
060	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
063	5	NSL	NSL	Occasional hyaline casts; NSL.	NSL	NSL	NSL	Congested Focal hemorrhage into cavity; NSL.
065	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
067	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
069	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
073	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
075	2	NSL	NSL	Occasional hyaline casts; NSL.	NSL	NSL	NSL	NSL
076	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL

## D. EXPERIMENT 4162: NOSE-ONLY EXPOSURE TO 1102

ANIMAL NUMBER	DAY OF STUDY	LUNG	LIVER	KIDNEY	SPLEEN	ADRENAL	THYROID	TURBINATES
077	5	NSL	NSL	Occasional hyaline casts; NSL.	NSL	NSL	NSL	
080	5	NSL	NSL	NSL	NSL	NSL	NSL	Multifocal rhinitis with squamous (acute) metaplasia in one section.
084	2	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	
085	2	NSL	NSL	NSL	NSL	NSL	NSL	Rhinitis with neutrophils in submucosa; nasal exudate and inhaled hair with some ulceration.
090	2	NSL	NSL	NSL	NSL	NSL	NSL	Mild multi- focal rhinitis; submucosal infiltrate.
095	2	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	
096	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	

070	2	NSL	NSL	Free hyaline casts; NSL.	NSL	NSL	NSL	NSL
088	5	NSL	NSL		NSL	NSL	NSL	NSL
103	5	NSL	NSL		NSL	NSL	NSL	NSL

Congested;  
slight  
increase in  
submucosal  
neutrophils.

## E. EXPERIMENT 4183: SHIN WHOLE-BODY EXPOSURES

ANIMAL NUMBER	DAY OF STUDY	LUNG	LIVER	KIDNEY	SPLEEN	ADRENAL	THYROID	TURBINATES
105	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
108	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
114	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
117	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
118	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
122	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
124	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
125	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
126	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL
128	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL

F. EXPERIMENT 416: SHAM NOSE-ONLY EXPOSURES

ANIMAL NUMBER	DAY OF STUDY	LUNG	LIVER	KIDNEY	SPLEEN	ADRENAL	THYROID	TURBONIMATES
129	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL
132	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
133	2	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL
135	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	Very mild rhinitis; neutrophils in submucosa.	NSL
137	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL
138	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL
146	2	NSL	NSL	Moderate hyaline casts.	NSL	NSL	Very mild rhinitis; neutrophils in submucosa.	NSL
149	5	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL
150	2	NSL	NSL	Moderate hyaline casts.	NSL	NSL	NSL	NSL
151	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL

## C. EXPERIMENT 4165: SHELF CONTROLS

ANIMAL NUMBER	DAY OF STUDY	LUNG	LIVER	KIDNEY	SPLAEN	ADRENAL	THYROID	TURBIMATES
158	2	NSL	NSL	Occasional hyaline casts.	NSL	NSL	NSL	NSL
160	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
162	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
163	5	NSL	NSL	Occasional hyaline casts.	NSL	NSL	NSL	NSL
167	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
169	2	NSL	NSL	NSL	NSL	NSL	NSL	NSL
172	2	NSL	NSL	Occasional hyaline casts.	NSL	NSL	NSL	NSL
173	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
179	5	NSL	NSL	NSL	NSL	NSL	NSL	NSL
180	5	NSL	NSL	Occasional hyaline casts.	NSL	NSL	NSL	NSL

\* Not significant lesion.

#### APPENDIX J. MISCELLANEOUS

This appendix contains example data sheets for analyses of Wayne Certified Rodent Blox Pellets done by Continental Grain Company, Libertyville, Illinois. Results for this lot of feed (P06185-1) are typical for this kind of feed, which was used in Phase I of this project.

CONTINENTAL GRAIN COMPANY  
P. O. BOX 459  
LIBERTYVILLE, ILLINOIS 60048  
312-362-1334

RESEARCH AND DEVELOPMENT CENTER  
WORLD MILLING INDUSTRIES GROUP

September 4, 1985

Dr. Charles Hobbs  
Assistant Director  
ITRI  
P.O. Box 5980  
Albuquerque, New Mexico 87185

Dear Dr. Hobbs,

Please find enclosed our raw data on the following lots of Wayne Certified Rodent Blox Pellets.

P061851  
P061852  
P072651  
P072652

Please contact me if you have any questions.

Sincerely,

*Robert E. Beverly*  
Robert E. Beverly  
Quality Assurance Manager  
Animal Health/Pet Products

*Carla*  
9-28-85

REB/jw

Enclosure

Continental Grain Co.

**CERTIFICATE OF FEED ANALYSIS**

PLANT NO. 010/738

FEED NO. 2728-00

CATEGORY NO. 3607

*Cat. Robert*  
*3607*

ROUTINE  SPECIAL STUDY  NON-ROUTINE

DATE MFG. 6-18-85 RUN OR BATCH NO. 206185-1

ANALYSIS:

LAB NO. 4934

GUAR.	CALC.	ASSAY
PROT.		<u>25.1</u>
MOIST.		<u>9.21</u>
ASH		<u>7.11</u>
FAT		<u>4.30</u>
FIBER		<u>4.02</u>
Ca		<u>1.41</u>
P		<u>0.99</u>
SALT		<u>0.74</u>
N.P.N.		
VITA		
THIAMINE		

REMARKS:

DATE RECEIVED 6/24/85

DATE COMPLETED 6/24/85

ANALYST *Robert*

RES-19C

RECEIPT

SPECIMEN  
R 4934 CONTINENTAL GRAIN

SPECIMEN I.D. NUMBER  
159371

ACCESSION #  
159371

REFERRING CLIENT

DATE COLLECTED  
07/01/85

TIME COLLECTED  
00:00

CLIENT LAB NO.  
00000

RECEIVED  
07/01/85  
REPORTED  
00/00/

CONTINENTAL GRAIN CO.

TEST	RESULT	REFERENCE LIMITS	UNITS
FEED SCREEN			
ARSENIC	0.24		PPM
CADMIUM	0.32		PPM
LEAD	0.31		PPM
MERCURY	<0.07		PPM
SELENIUM	0.53		PPM
AFLATOXIN B1	<0.01	DL <0.01	PPM
AFLATOXIN B2	<0.01	DL <0.01	PPM
AFLATOXIN G1	<0.01	DL <0.01	PPM
AFLATOXIN G2	<0.01	DL <0.01	PPM
ALDRIN	<0.01	DL <0.01	PPM
DIELDRIN	<0.01	DL <0.01	PPM
ENDRIN	<0.01	DL <0.01	PPM
HEPTACHLOR	<0.01	DL <0.01	PPM
HEPTACHLOREPOXIDE	<0.01	DL <0.01	PPM
LINDANE	<0.01	DL <0.01	PPM
CHLORDANE	<0.01	DL <0.01	PPM
DDT RELATED SUBS.	<0.10		
TOXAPHENE	<0.10	DL <0.10	PPM
PCBS	<0.10	DL <0.10	PPM
DIAZINON	<0.10		PPM
DISULFATON	<0.10	DL <0.10	PPM
ETHION	<0.10	DL <0.10	PPM
MALATHION	0.12	DL <0.10	PPM
METHYL PARATHION	<0.10	DL <0.10	PPM
PARATHION	<0.10	DL <0.10	PPM
THIMET	<0.10	DL <0.10	PPM
THIODAN	<0.10	DL <0.10	PPM
TRITHION	<0.10	DL <0.10	PPM
CAROTENE	1.85		PPM
NITROGEN, NITRATE	0.60		PPM
NITROGEN, NITRITE	<0.01		PPM
STANDARD PLATE COUNT	10500		
COLIFORMS, FECAL	0		COL/ML
E. COLI	0		MPN
BHA.	<0.10	DL <0.01	PPM
BHT	<0.10	DL <0.01	PPM
NITROSAMINES	<0.10		MCG/L
ALPHA BHC	<0.01		PPM

SPECIMEN  
R 4934 CONTINENTAL GRAIN

REFERRING CLIENT

CONTINENTAL GRAIN CO.

SPECIMEN I.D. NUMBER  
159371 JUL 10 1985

ACCESSION NO.  
159371

DATE COLLECTED  
07/01/85

TIME COLLECTED  
00:00

RECEIVED  
07/01/85  
REPORTED  
00/00/00

CLIENT LAB NO.  
00000

TEST	RESULT	REFERENCE LIMITS	UNITS
BETA BHC	<0.01		PPM
DELTA BHC	<0.01		PPM
4, 4'DDE	<0.10		PPM
4, 4'DDD	<0.10		PPM
HCB	<0.10		PPM
MIREX	<0.10	DL <0.01	PPM
METHOXYCHLOR	<0.10	DL <0.01	PPM
TELODRIN	<0.10	DL <0.01	PPM
RONNEL	<0.10	DL <0.01	PPM
ETHYL PARATHION	<0.10	DL <0.01	PPM
ALPHA ENDOSULFAN	<0.10	DL <0.10	PPM
BETA ENDOSULFAN	<0.10		PPM
ENDOSULFAN SULFATE	<0.10		PPM

*Leibert*  
9-28-85

ASSAY DOVE 88  
APPROVED BY PRO LAB MGR: 28-AUG-85  
DISTRIBUTE TO ROB REVERLY

ASSAY # R4934

DATE

AS FED

PLANT PROD TYPE MFG BATCH COMMENT COMMENT  
010 872800 SPECIAL 850613 P05135-1 CERT RODENT BLOX

TEST UNITS RESULT C-VALUE GUAR-VALUE

XI. LIST OF PUBLICATIONS

Snipes, M. B., A. G. Harmsen, J. A. Pickrell, F. F. Hahn, H. C. Yeh and  
F. A. Seiler. Inhalation of Cu-Zn Alloy and  $TiO_2$  by Rats: Exposure  
Stress Evaluation. Proceedings of the Smoke/Obscurants Symposium X,  
Harry Diamond Laboratories, Adelphi, MD, 22-24 April 1986.

## XII. PERSONNEL SUPPORTED BY PROJECT

<u>Name</u>	<u>Duty</u>
<b>A. Professional</b>	
Snipes, M. B.; Ph.D.	Principal investigator responsible for coordination of activities in the project.
Harmsen, A. G.; Ph.D.	Immunologist responsible for activities related to animal stress evaluation.
Damon, E. G.; Ph.D.	Data management in Path/Tox Data Base System.
Eidson, A. F.; Ph.D.	Coordinate activities associated with analytical techniques used in this project.
Hahn, F. F.; D.V.M., Ph.D.	Pathology evaluations.
Harris, D. L.; M.S.	Quality Assurance.
Hobbs, C. H.; D.V.M.	Veterinarian for project and member of the ITRI directorate in charge of this research.
Lopez, J. A.; B.S., Ch.E.	Responsible for maintaining facilities.
Pickrell, J. A.; D.V.M., Ph.D.	Blood chemistry evaluations.
Seiler, F. A.; Ph.D.	Statistician for project.
Thompson, J. J.; Ph.D.	Health protection and safety.
Yeh, H. C.; Ph.D.	Responsible for aerosol science activities.
<b>B. Technical</b>	
Brodbeck, R. D.	Construct, test and operate aerosol generation and animal inhalation exposure apparatus.
Ferris, A. A.	Conduct blood chemistry evaluations.
Luckey, M. J.	Conduct atomic absorption analyses.
Salas, E. J.	Animal handling and assistance with exposures and necropsies.
Vigil, W. J. E.	Construct, test and operate aerosol generation and animal inhalation exposure apparatus.

### XIII. DISTRIBUTION LIST

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1	Commander/Director Chemical Research, Development and Engineering Center ATTN: SMCCR-RST-E (Mr. Weimer) Aberdeen Proving Ground, MD 21010-5423
1	Officer-in-Charge Naval Medical Research Institute Toxicology Detachment Building 433 Wright-Patterson AFB, OH 45433
1	HQDA (DASG-PSP-0) 5111 Leesburg Pike Falls Church, VA 22041-3258
1	Commander US Air Force Aerospace Medical Research Laboratory ATTN: Toxic Hazards Division Bldg. 79, Area B Wright-Patterson AFB, OH 45433
1	Commander US Army Medical Research and Development Command ATTN: SGRD-PLC Fort Detrick Frederick, MD 21701-5012
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Fort Detrick, Frederick, MD 21701-5010

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Fort Detrick, Frederick, MD 21701-5012

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Cameron Station  
Alexandria, VA 22314

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Dean, School of Medicine  
Uniformed Services University of  
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4301 Jones Bridge Road  
Bethesda, MD 20014

3

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and Development Laboratory  
ATTN: SGRD-UBG-M  
Fort Detrick, Frederick, MD 21701-5010

END

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DTIC